



US009543442B2

(12) **United States Patent**
Ge et al.

(10) **Patent No.:** **US 9,543,442 B2**
(45) **Date of Patent:** **Jan. 10, 2017**

(54) **MANUFACTURE METHOD OF DUAL GATE
OXIDE SEMICONDUCTOR TFT SUBSTRATE
AND STRUCTURE THEREOF**

(71) Applicant: **Shenzhen China Star Optoelectronics
Technology Co., Ltd.**, Shenzhen (CN)

(72) Inventors: **Shimin Ge**, Shenzhen (CN); **Hejing
Zhang**, Shenzhen (CN); **Chihyuan
Tseng**, Shenzhen (CN); **Chihyu Su**,
Shenzhen (CN); **Wenhui Li**, Shenzhen
(CN); **Longqiang Shi**, Shenzhen (CN);
Xiaowen Lv, Shenzhen (CN)

(73) Assignee: **SHENZHEN CHINA STAR
OPTOELECTRONICS
TECHNOLOGY CO., LTD.**,
Shenzhen, Guangdong (CN)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/763,823**

(22) PCT Filed: **May 21, 2015**

(86) PCT No.: **PCT/CN2015/079477**

§ 371 (c)(1),

(2) Date: **Jul. 28, 2015**

(87) PCT Pub. No.: **WO2016/165187**

PCT Pub. Date: **Oct. 20, 2016**

(65) **Prior Publication Data**

US 2016/0308066 A1 Oct. 20, 2016

(30) **Foreign Application Priority Data**

Apr. 14, 2015 (CN) 2015 1 0175653

(51) **Int. Cl.**
H01L 21/00 (2006.01)
H01L 29/786 (2006.01)

(Continued)

(52) **U.S. Cl.**
CPC **H01L 29/78648** (2013.01); **G02F 1/1368**
(2013.01); **G02F 1/13439** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC H01L 29/786; H01L 29/417; H01L 33/62
(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,577,374 B1 * 6/2003 Nakata G02F 1/13394
349/138

9,129,992 B2 * 9/2015 Zhang H01L 29/78648
(Continued)

Primary Examiner — Caleb Henry

(74) *Attorney, Agent, or Firm* — Leong C. Lei

(57) **ABSTRACT**

The present invention provides a manufacture method of an oxide semiconductor TFT substrate and a structure thereof. The manufacture method of the dual gate oxide semiconductor TFT substrate utilizes the halftone mask to implement one photo process, which cannot only accomplish the patterning to the oxide semiconductor layer but also obtain the oxide conductor layer (52') with ion doping process, and the oxide conductor layer (52') is employed as being the pixel electrode of the LCD to replace the ITO pixel electrode in prior art; the method manufactures the source (81), the drain (82) and the top gate (71) at the same time with one photo process; the method implements patterning process to the passivation layer (8) and the top gate isolation layer (32) together with one photo process, to reduce the number of the photo processes to five for shortening the manufacture procedure, raising the production efficiency and lowering the production cost.

6 Claims, 5 Drawing Sheets

